

## Camp Creek Restoration Project: A Preliminary Year of Activities



Verbena, a desirable species for restoration

### Projects: AZPMC-T-0704-CR and AZPMC-0705-CR

At the request of the Tonto National Forest, the Tucson PMC agreed to assist with a restoration project for which the Forest received a grant to conduct. The area in question is the Camp Creek drainage, a riparian drainage north of Cave Creek, Arizona, which burned in a catastrophic fire in 2005. Following the fire, several invasive species, in particular Vinca (*Vinca major*), and small patches of several others including Giant reed (*Arundo donax*), Tree of heaven (*Ailanthus altissima*) and Jerusalem thorn (*Parkinsonia aculeate*), increased within the creek's channels and arid slopes. In order to remove the Vinca and the other nonnative invaders without increasing erosion, appropriate native ground cover was proposed be planted in place of the infestation.

The first step was to choose appropriate replacement plants for the Camp Creek drainage—those that produce good ground cover for soil stability, and a mixture of common species that have proven themselves adapted to the area as well as attractive species that would be acceptable to home owners. Vinca, attractive with purple flowers and an abundance of vegetation, was originally planted in the area as an ornamental, and the Forest feared negative public backlash at its removal. The Forest planned a series of public relation meetings to discuss the project, and at one of the meetings homeowners were invited to attend a field trip to visit some of the proposed restoration sites and to address specifics of the project on site with members of the Forest and the Tucson PMC. In Spring 2007 the field trip attracted several homeowners, all of which appeared interested and curious about the project. Stems of several species were collected to experiment with pole plantings for the containerized plantings in the future.



Patti Fenner of the Tonto National Forest, shin deep in Vinca

In May, a crew of seed collectors took another tour of the area to several sites within the drainage to locate good stands of native vegetation from which to make seed collections. Attendees of this tour included the Forest, the PMC, interested individuals from the Phoenix Botanical Gardens, and several volunteers including a few Camp Creek homeowners, to learn about species in the area and how to collect seed of the appropriate ones. A number of collections were made that day, and in the months following, the

Forest, a hired contractor (one of the original volunteers), and two other dedicated volunteers frequently visited these areas and other sites throughout the drainage, making additional collections and checking for times of ripening seed. Several species required multiple site checks in order to be present for optimum timing for seed maturation and collection. The goal of the collections was to harvest seed from a large diversity of species, and from multiple plants and locations of each species, in order to increase genetic diversity. By the end of the fall of 2007, over 50 collections of over 30 species had been collected (Table 1), each located with GPS. The collections were mailed to the PMC for cleaning and storage.



A group of volunteers take notes in preparation for seed collections

In order to determine the number of plants that could be grown for this project from the seed collections, the PMC cleaned the seed, weighted it and estimated number of seed using references online [and other locations? Should cite] or using the counting meter. The predicted total number of plants that could be grown from these seed stores was determined by the following simple calculation:

Number of plants = (# seed) multiplied by (25% seed viability) divided by (4 seed/pot)

The estimated number of seed is multiplied by 25% seed viability, a typical expectation for wildland seed collections, and then divided by 4, as each pot should be sowed with at least 4 seeds in case of poor seed quality or other complications in planting. In other words, the predicted number of plants that could potentially be grown for each species was calculated by dividing the estimated number of seed by 8.

This simple calculation was useful to predict the number of plants that could be grown, but it also demonstrated to the seed collectors which species so far would likely be dominant in the restoration, which species would unlikely be represented due to lack of seed, and illuminated certain desirable species worthy of additional seed collection trips. As a result of this information, the several more collections were made of certain species the following spring.

Before any restoration project can take place in Camp Creek, the Forest is responsible for the removal of Vinca and other invasive species. Once given permission to spray herbicides in the forest, they will ideally conduct weed control for at least two growing seasons. Once the Vinca has been removed, the PMC and a nonprofit nursery in Tucson plan to grow several thousands of plants for the eventual restoration.



Golden columbine, a desirable restoration species

**Table 1. Camp Creek Seed Collection Quantities**

<b>Species</b>	<b>Common Name</b>	<b>post-clean weight (g)</b>	<b>approx. # of seeds</b>	<b>approx. # of plants<sup>1</sup></b>
<i>Aquilegia chrysantha</i>	Golden columbine	18.25	Millions	X
<i>Aquilegia chrysantha</i>	Golden columbine	6.46	Millions	X
<i>Aristolochia watsonii</i>	Watson's dutchman's pipe	2.91	~ 400	25
<i>Clematis drummondii</i>	Drummond's Clematis	30.18	~ 10,000	X
<i>Datura inoxia</i>	Datura	10.38	~ 800	50
<i>Glandularia bipinnatifida</i>	Dakota mock vervain	1.26	~ 400	25
<i>Glandularia bipinnatifida</i>	Dakota mock vervain	5.41	~ 1000	62
<i>Glandularia gooddingii</i>	Goodding's verbena	0.87	~ 2000	125
<i>Glandularia gooddingii</i>	Goodding's verbena	0.59	~ 1500	93
<i>Ipomoea hederifolia</i>	Scarlet creeper	3.26	~ 300	18
<i>Ipomoea hederifolia</i>	Scarlet creeper	4.15	~ 500	31
<i>Ipomea sp.</i>	Morning glory sp.	1.24	77	4
<i>Janusia gracilis</i>	Slender janusia	17.67	~ 10000	X
<i>Janusia gracilis</i>	Slender janusia	15.72	~ 10000	X
<i>Juncus xiphioides</i>	Irishleaf rush	1.17	~ 100,000	X
<i>Maurandella antirrhiniflora</i>	Roving sailor	0.43	~ 2000	125

<b>Species</b>	<b>Common Name</b>	<b>post-clean weight (g)</b>	<b>approx. # of seeds</b>	<b>approx. # of plants<sup>1</sup></b>
Maurandella antirrhiniflora	Roving sailor	0.21	134	8
Maurandella antirrhiniflora	Roving sailor	2.77	1900	118
Maurandella antirrhiniflora	Roving sailor	2.61	1669	104
Mimulus guttatus	Monkey flower	0.06	Lots	X
Mimulus guttatus	Monkey flower	0.03	Lots	X
Mimulus guttatus	Monkey flower	5.31	Billions	X
Mirabilis albida	White 4 o'clock	0.39	35	2
Mirabilis albida	White 4 o'clock	0.74	60	3
Mirabilis albida	White 4 o'clock	0.72	60	3
Mirabilis coccinea	Scarlet four o'clock	1.6	~ 150	9
Mirabilis coccinea	Scarlet four o'clock	0.15	10	1
Mirabilis multiflora	Colorado four o'clock	0.16	8	1
Muhlenbergia rigins	Deer grass	15.21	Millions	X
Northoscordum texanum	Texas false garlic	0.17	50	3
Oenothera caespitosa	Tufted evening primrose	9.66	27686	X
Oenothera caespitosa	Tufted evening primrose	7.3	20922	X

<b>Species</b>	<b>Common Name</b>	<b>post-clean weight (g)</b>	<b>approx. # of seeds</b>	<b>approx. # of plants<sup>1</sup></b>
Oligoneuron sp (rigidum?)	Goldenrod	1.21	Thousands	X
Oligoneuron sp (rigidum?)	Goldenrod	2.98	Millions	X
Penstemon pseudospectabilis	Desert penstemon	14.83	Millions	X
Penstemon pseudospectabilis	Desert penstemon	14.06	Millions	X
Penstemon pseudospectabilis	Desert penstemon	16.9	Millions	X
Phaseolus angustissimus	Slimleaf bean	0	1	<1
Phaseolus angustissimus	Slimleaf bean	1.17	~ 50	3
Phaseolus angustissimus	Slimleaf bean	1.99	~ 100	6
Rhus microphylla	Little leaf sumac	4.93	~ 30	1
Rhus ovata	Sugar sumac sumac	20.62	~ 150	9
Rhus trilobata	Skunkbush sumac	116.71	Hundreds	X
Rhus trilobata	Skunkbush sumac	182.4	Hundreds	X
Rhynchosia senna	Texas snoutbean	<0.10	4	<1
Rhynchosia senna	Texas snoutbean	0	2	<1
Salix gooddingii	Goodding's willow	0.13	~ 500	31
Salvia columbariae	Chia	0.3	~ 130	8

<b>Species</b>	<b>Common Name</b>	<b>post-clean weight (g)</b>	<b>approx. # of seeds</b>	<b>approx. # of plants<sup>1</sup></b>
Sphaeralcea coccinea	Globemallow	1.54	~ 2000	125
Solanum xanti	Chaparral nightshade	9.03	~ 400	25
Vitis arizonica	Canyon grape	100.28	~ 1000	62
Vitis arizonica	Canyon grape	95.41	~ 1000	62
Unknown (says Salvia)		7.72	~ 10000	X

<sup>1</sup>X = innumerable plants can be grown from this collection

Rows highlighted in grey demonstrate collections that have expected plant values of zero to none.